

Claims

1. A method for determining a delay of a spread data symbol stream, comprising the steps of:
  - 5 - at least partially correlating a signal, which comprises at least first and second spread data symbol streams that are obtained by spreading at least a first and second data symbol stream with a respective first and second code, with said first code to obtain at least two portions of a  
10 cross-correlation function between said signal and said first code, and
  - combining said at least two portions of said cross-correlation function to obtain a combined cross-correlation function portion from which a first delay of  
15 said first spread data symbol stream is determined, wherein said first code and said second code are composed of chips and wherein the number of chips of said first code is different from the number of chips of said second code.
- 20 2. The method according to claim 1, wherein said step of combining said at least two portions of said cross-correlation function comprises the step of averaging said at least two portions of said cross-correlation function or integrating said at least two portions of said cross-  
25 correlation function.
3. The method according to claim 1, wherein the number of chips of said first code and the number of chips of said second code are not multiples of each other.
- 30 4. The method according to claim 1, wherein the chip rates of said at least first and second spread data symbol streams are equal.

5. The method according to claim 1, wherein N chips of said  
at least first and second spread data symbol stream are  
contained in a frame, respectively, and wherein N is the  
5 least common multiple of the number of chips of said first  
code and the number of chips of said second code.
6. The method according to claim 1, wherein said first code  
and second code are software codes and/or pseudo-random  
10 noise codes.
7. The method according to claim 1, wherein said first code  
and second code are taken from the same basic code and  
only differ in the number of chips.
- 15 8. The method according to claim 1, wherein said signal  
further comprises a third spread data symbol stream that  
is obtained by spreading a third data symbol stream with a  
third code, wherein said third code is composed of chips  
20 and wherein the number of chips of said third code is  
equal to the number of chips of said first code or to the  
number of chips of said second code.
9. The method according to claim 1, wherein said first and  
25 second codes are time-invariant.
10. The method according to claim 1, wherein said first and  
second codes are changed in certain intervals.
- 30 11. The method according to claim 10, wherein said first  
and second codes are periodically changed so that the  
average number of chips in said respective first and  
second code is equal.

12. A method for determining a delay of a spread data symbol stream, comprising the steps of:

- 5       - at least partially correlating a signal, which comprises at least first and second spread data symbol streams that are obtained by spreading at least a first and second data symbol stream with a respective first and second code, with said first code to obtain at least two portions of a cross-correlation function between said signal and said  
10       first code, and
- combining said at least two portions of said cross-correlation function to obtain a combined cross-correlation function portion from which a first delay of said first spread data symbol stream is determined,  
15       wherein said first code and said second code are composed of chips and wherein the number of chips of said first code is different from the number of chips of said second code, wherein said signal is a receive signal comprising  
20       the superposed spread data symbol streams that have been transmitted by satellite transmitters and received at a receiver with respective propagation delays, and wherein said propagation delays are indicative of the distance between said receiver and said respective satellite  
25       transmitters.

13. The method according to claim 12, wherein said satellite transmitters are satellite transmitters of a Global Navigation Satellite System (GNSS).

14. A computer program with instructions stored in a readable memory operable to cause a processor to perform the method steps of claim 1.

15. A computer program product comprising a computer program  
with instructions stored in a readable memory, the  
instructions operable to cause a processor to perform the  
5 method steps of claim 1.

16. A device for determining a delay of a spread data symbol  
stream, comprising:  
- means for at least partially correlating a signal, which  
10 comprises at least first and second spread data symbol  
streams that are obtained by spreading at least a first  
and second data symbol stream, with a respective first and  
second code with said first code to obtain at least two  
portions of a cross-correlation function between said  
15 signal and said first code, and  
- means for combining said at least two portions of said  
cross-correlation function to obtain a combined cross-  
correlation function portion from which a first delay of  
said first spread data symbol stream is determined,  
20 wherein said first code and said second code are composed  
of chips and wherein the number of chips of said first  
code is different from the number of chips of said second  
code.

25 17. A system, comprising:  
- at least a first and a second transmitter, which transmit  
respective first and second spread data symbol streams  
that are obtained by spreading at least a respective first  
30 and second data symbol stream with a respective first and  
second code, wherein said first code and said second code  
are composed of chips and wherein the number of chips of

said first code is different from the number of chips of said second code, and

- at least one receiver, wherein said receiver receives a signal comprising at least said respective first and second spread data symbol streams, wherein said receiver at least partially correlates said signal with said first code to obtain at least two portions of a cross-correlation function between said signal and said first code, and wherein said receiver combines said at least two portions of said cross-correlation function to obtain a combined cross-correlation function portion from which a first delay of said first spread data symbol stream is determined.